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(54) **ELECTRODE ASSEMBLY AND BATTERY**

(57) This application provides an electrode assembly, including a first electrode plate, a second electrode plate, and a separator. The electrode assembly is formed by winding the first electrode plate, the separator, and the second electrode plate. A first tab formed by a plurality of first tab units and a second tab formed by a plurality of second tab units are disposed on the first electrode

plate, and a third tab formed by a plurality of third tab units is disposed on the second electrode plate. The electrode assembly is provided with a multi-tab structure to achieve purposes of enhancing a current-carrying capacity of the battery and reducing a temperature rise. This application further provides a battery containing the electrode assembly.

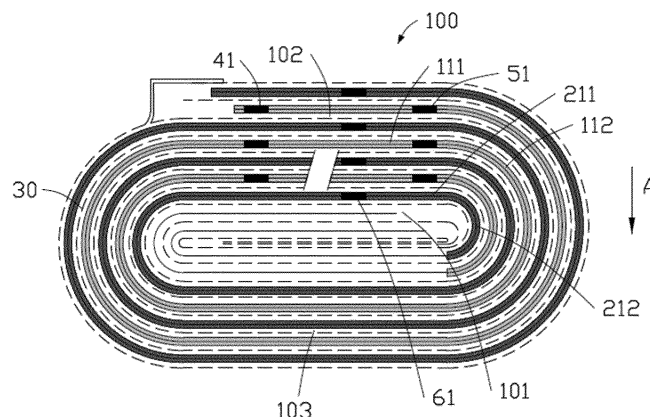


FIG. 2

Description

TECHNICAL FIELD

[0001] This application relates to the field of batteries, and in particular, to an electrode assembly and a battery that contains the electrode assembly.

BACKGROUND

[0002] The application of 5G is accompanied with higher requirements imposed by consumers on battery performance of a portable electronic product such as a smart phone and a tablet computer. Existing batteries have a problem of high temperature rise in both the battery and the integrated electronic product, and the performance of the battery and the electronic product may deteriorate if the temperature rise is too high. The existing battery adopts a two-tab structure, which does not improve an overall current-carrying capacity of the battery, and therefore, the temperature rise of the battery and the integrated electronic product is still relatively high.

SUMMARY

[0003] In view of the foregoing situation, it is necessary to provide an electrode assembly capable of increasing a current-carrying capacity of a battery and reducing a temperature rise, and to provide a battery containing the electrode assembly.

[0004] This application provides an electrode assembly, including a first electrode plate, a second electrode plate, and a separator. A polarity of the second electrode plate is opposite to a polarity of the first electrode plate, and the separator is disposed between the first electrode plate and the second electrode plate. The electrode assembly is formed by winding the first electrode plate, the separator, and the second electrode plate. A plurality of first tab units and a plurality of second tab units are disposed on the first electrode plate, and a plurality of third tab units are disposed on the second electrode plate. In a thickness direction of the electrode assembly, the plurality of first tab units are stacked to form a first tab, the plurality of second tab units are stacked to form a second tab, and the plurality of third tab units are stacked to form a third tab. The three tabs may be configured as two positive tabs and one negative tab, or two negative tabs and one positive tab. The plurality of tabs are connected in parallel to shunt a current to reduce a temperature rise of the electrode assembly.

[0005] In an optional embodiment, in the thickness direction of the electrode assembly, projections of the first tab, the second tab, and the third tab on a projection plane perpendicular to the thickness direction of the electrode assembly do not overlap, so that the electrode assembly exhibits a three-tab structure exteriorly.

[0006] Further, the first electrode plate includes a plurality of first winding units. The plurality of first tab units

and the plurality of second tab units are distributed on the plurality of first winding units. The second electrode plate includes a plurality of second winding units. The plurality of third tab units are distributed on the plurality of second winding units. Each first winding unit includes a first straight portion and a first bent portion. Each second winding unit includes a second straight portion and a second bent part. A plurality of first straight portions and a plurality of the second straight portions are alternately stacked.

[0007] Further, two adjacent first tab units are interspaced with a layer of the first straight portion containing no first tab unit, and the first straight portion containing no first tab unit is defined as a spacer layer, thereby avoiding a too short distance between the first tab units.

[0008] In an optional embodiment, the second tab units are disposed on the spacer layers. In other words, the first tab units are disposed on a first winding unit different from that on which the second tab units are disposed.

[0009] In an optional embodiment, the electrode assembly includes a winding initiation end. The winding initiation end divides the electrode assembly into a first part and a second part in the thickness direction of the electrode assembly. The plurality of first tab units are disposed in the first part, and the plurality of second tab units are disposed in the second part, thereby increasing a spacing between the first tab and the second tab.

[0010] In an optional embodiment, one first tab unit and one second tab unit may be disposed on at least one first winding unit.

[0011] In an optional embodiment, two adjacent third tab units are interspaced with at least one second winding unit to increase a spacing between the adjacent third tab units.

[0012] In an optional embodiment, one third tab unit may also be disposed on each second winding unit.

[0013] In a length direction of the electrode assembly, the first tab units are located at a first end of the electrode assembly, and the second tab units are located at a second end of the electrode assembly. Therefore, in the length direction of the electrode assembly, the first tab extends from the first end of the electrode assembly, and the second tab extends from the second end of the electrode assembly.

[0014] In an optional embodiment, the electrode assembly includes a tab plate, the first tab units being configured as a first end of the tab plate, the second tab units being configured as a second end of the tab plate, the tab plate is disposed on the first winding unit, and the first end and the second end of the tab plate extend from the first winding unit. The disposition of the tab plate is conducive to simplifying an installation process of the first tab and the second tab.

[0015] In an optional embodiment, the plurality of first tab units, the plurality of second tab units, and the first electrode plate are integrally formed, and the plurality of third tab units and the second electrode plate are integrally formed.

[0016] In an optional embodiment, a plurality of fourth tab units are further disposed on the first electrode plate or the second electrode plate, and the plurality of fourth tab units are stacked in the thickness direction of the electrode assembly to form a fourth tab. The disposition of the fourth tab can further shunt the current and enhance the current-carrying capacity of the electrode assembly.

[0017] Further, in a length direction of the electrode assembly, the third tab is located at the first end of the electrode assembly, and the fourth tab is located at the second end of the electrode assembly.

[0018] In an optional embodiment, in the thickness direction of the electrode assembly, a projection of the third tab on the projection plane is located between a projection of the first tab and a projection of the second tab.

[0019] In an optional embodiment, at least two electrical connection portions are disposed at an end of the first tab extending from the electrode assembly. The at least two electrical connection portions are interspaced and configured for connection with an external circuit or an electrical appliance. In this way, the first tab is divided into two tabs of identical polarity, thereby further shunting the current and increasing the current-carrying capacity of the electrode assembly.

[0020] In an optional embodiment, a material of the first tab or the third tab is copper, nickel, or nickel-plated copper.

[0021] This application further provides a battery, including a housing and an electrode assembly. The electrode assembly is any of the electrode assemblies described above, and the housing accommodates the electrode assembly.

[0022] Further, the battery includes a plurality of electrode terminals disposed on an outer surface of the housing, and each electrode terminal is electrically connected to the first tab, the second tab, and the third tab separately.

[0023] In the electrode assembly, the first tab, the second tab, and the third tab are formed by winding a plurality of tab units together with the electrode plates. Therefore, the electrode assembly exhibits a multi-tab structure, and shunts the current by using a plurality of parallel-connected tabs, thereby enhancing the current-carrying capacity of the battery and reducing the temperature rise.

BRIEF DESCRIPTION OF DRAWINGS

[0024]

FIG. 1 is an expanded schematic structural diagram of a first electrode plate and a second electrode plate of an electrode assembly according to a first embodiment;

FIG. 2 is a schematic diagram of a jelly-roll structure of an electrode assembly according to a first embodiment;

FIG. 3 is a schematic diagram of an exterior structure

of an electrode assembly according to a first embodiment;

FIG. 4 is an expanded schematic structural diagram of a first electrode plate and a second electrode plate according to a second embodiment;

FIG. 5 is a schematic diagram of a jelly-roll structure of an electrode assembly according to a second embodiment;

FIG. 6 is an expanded schematic structural diagram of a first electrode plate and a second electrode plate according to a third embodiment;

FIG. 7 is a schematic diagram of a jelly-roll structure of an electrode assembly according to a third embodiment;

FIG. 8 is an expanded schematic structural diagram of a first electrode plate and a second electrode plate according to a fourth embodiment;

FIG. 9 is a schematic diagram of a jelly-roll structure of an electrode assembly according to a fourth embodiment;

FIG. 10 is an expanded schematic structural diagram of a first electrode plate and a second electrode plate according to a fifth embodiment;

FIG. 11 is a schematic structural diagram of a lateral surface of an electrode assembly according to a fifth embodiment;

FIG. 12 is a schematic diagram of an exterior structure of an electrode assembly according to a fifth embodiment;

FIG. 13 is an expanded schematic structural diagram of a first electrode plate and a second electrode plate according to a sixth embodiment;

FIG. 14 is a schematic diagram of a jelly-roll structure of an electrode assembly according to a sixth embodiment;

FIG. 15 is an expanded schematic structural diagram of a first electrode plate and a second electrode plate according to a seventh embodiment;

FIG. 16 is a schematic diagram of a jelly-roll structure of an electrode assembly according to a seventh embodiment;

FIG. 17 is a schematic diagram of a bent structure of a tab;

FIG. 18 is a schematic structural diagram of a tab plate and a first electrode plate;

FIG. 19 is a schematic structural diagram of an electrode assembly according to an eighth embodiment; and

FIG. 20 is a schematic structural diagram of a battery according to a ninth embodiment.

Reference numerals:

[0025]

Electrode assembly 100

Winding initiation end 101

First part 102

Second part 103
 First end 104
 Second end 105
 First electrode plate 10
 First winding unit 11
 First straight portion 111
 First bent portion 112
 Second electrode plate 20
 Second winding unit 21
 Second straight portion 211
 Second bent portion 212
 Separator 30
 First tab 40
 First tab unit 41
 Electrical connection portion 42
 Second tab 50
 Second tab unit 51
 Third tab 60
 Third tab unit 61
 Fourth tab unit 71
 Tab plate 80
 First end 81
 Second end 82

DETAILED DESCRIPTION OF EMBODIMENTS

[0026] The following clearly and fully describes the technical solutions in the embodiments of this application with reference to the drawings hereof. Apparently, the described embodiments are merely a part of but not all of the embodiments of this application. All other embodiments derived by a person of ordinary skill in the art based on the embodiments of this application without making any creative efforts shall fall within the protection scope of this application.

[0027] It needs to be noted that an element referred to as being "fixed to" another element may directly exist on the other element or may be fixed to the other element through an intermediate element. An element considered to be "connected to" another element may be directly connected to the other element or may be connected to the other element through an intermediate element. An element considered to be "disposed on" another element may be directly disposed on the other element or may be disposed on the other element through an intermediate element. The terms "vertical", "horizontal", "left", "right" and similar expressions used herein are merely for ease of description.

[0028] Unless otherwise defined, all technical and scientific terms used herein have the same meanings as usually understood by a person skilled in the technical field of this application. The terms used in the specification of this application herein are merely intended for describing specific embodiments but are not intended to limit this application. The term "and/or" used herein is intended to include any and all combinations of one or more related items preceding and following the term.

[0029] This application provides an electrode assembly,

bly, including a first electrode plate, a second electrode plate, and a separator. A polarity of the second electrode plate is opposite to a polarity of the first electrode plate, and the separator is disposed between the first electrode plate and the second electrode plate. The electrode assembly is formed by winding the first electrode plate, the separator, and the second electrode plate. A plurality of first tab units and a plurality of second tab units are disposed on the first electrode plate, and a plurality of third tab units are disposed on the second electrode plate. In a thickness direction of the electrode assembly, the plurality of first tab units are stacked to form a first tab, the plurality of second tab units are stacked to form a second tab, and the plurality of third tab units are stacked to form a third tab.

[0030] In the electrode assembly, the first tab, the second tab, and the third tab are formed by winding a plurality of tab units together with the electrode plates. Therefore, the electrode assembly exhibits a multi-tab structure, and shunts the current by using a plurality of parallel-connected tabs, thereby enhancing the current-carrying capacity of the battery and reducing the temperature rise.

[0031] The following describes some embodiments of this application in detail. To the extent that no conflict occurs, the following embodiments and the features in the embodiments may be combined with each other.

First Embodiment

[0032] Referring to FIG. 1, FIG. 2, and FIG. 3, in an embodiment, the electrode assembly 100 includes a first electrode plate 10, a second electrode plate 20, and a separator 30. A polarity of the second electrode plate 20 is opposite to a polarity of the first electrode plate 10, and the separator 30 is disposed between the first electrode plate 10 and the second electrode plate 20. The electrode assembly 100 is formed by winding the first electrode plate 10, the separator 30, and the second electrode plate 20. A plurality of first tab units 41 and a plurality of second tab units 51 are disposed on the first electrode plate 10, and a plurality of third tab units 61 are disposed on the second electrode plate 20. A direction indicated by an arrow A in FIG. 2 is a thickness direction of the electrode assembly 100. In the thickness direction of the electrode assembly 100, the plurality of first tab units 41 are stacked to form a first tab 40, the plurality of second tab units 51 are stacked to form a second tab 50, and the plurality of third tab units 61 are stacked to form a third tab 60. Referring to FIG. 17, after the plurality of tab units are stacked, the plurality of tab units are uniformly bent to form a tab configured to connect an external adapter or an external circuit.

[0033] Further, in the thickness direction of the electrode assembly 100, projections of the first tab 40, the second tab 50, and the third tab 60 on a projection plane perpendicular to the thickness direction of the electrode assembly do not overlap, so that the electrode assembly 100 can exhibit a three-tab structure exteriorly. The three

tabs may be configured as two positive tabs and one negative tab, or two negative tabs and one positive tab. The plurality of tabs are connected in parallel to shunt a current to reduce a temperature rise of the electrode assembly. According to an embodiment of this application, a material of the negative tab may be selected from copper, nickel, or nickel-plated copper. The first tab units 41 and the second tab units 51 are disposed on the first tab 10, and the third tab units 61 are disposed on the second tab 20. Therefore, the polarity of the first tab 40 and the second tab 50 is identical to that of the first electrode plate 10, and the polarity of the third tab 60 is identical to that of the second electrode plate 20.

[0034] The first electrode plate 10 includes a plurality of first winding units 11. The plurality of first tab units 41 and the plurality of second tab units 51 are distributed on the plurality of first winding units 11. The second electrode plate 20 includes a plurality of second winding units 21. The plurality of third tab units 61 are distributed on the plurality of second winding units 21. Each first winding unit 11 includes a first straight portion 111 and a first bent portion 112. Each second winding unit 21 includes a second straight portion 211 and a second bent portion 212. The plurality of first straight portions 111 and the plurality of second straight portions 211 are alternately stacked. The winding units shown in the expanded schematic structural diagram of the electrode plate in FIG. 1 are merely exemplary. Lengths of the plurality of first and second winding units may be different, depending on an actual winding situation.

[0035] Further, one first tab unit 41 and one second tab unit 51 is disposed on at least one first winding unit 11. The electrode assembly 100 includes a winding initiation end 101. In the thickness direction of the electrode assembly 100, the winding initiation end 101 divides the electrode assembly 100 into a first part 102 and a second part 103. Specifically, a part below the winding initiation end 101 is the first part 102, and a part above the winding initiation end 101 is the second part 103.

[0036] In the first embodiment, the first winding units 11 are sorted when the first electrode plate 10 is unwound, and both the first tab units 41 and the second tab units 51 are disposed on the odd-numbered first winding units 11. The second winding units 21 are sorted when the second electrode plate 20 is unwound, and the third tab units 61 are disposed on the odd-numbered second winding units 21. Therefore, after a winding process is completed, the first tab units 41, the second tab units 51, and the third tab units 61 are all disposed in the first part 102. In the first part 102, one first tab unit 41 and one second tab unit 51 are disposed on the first straight portion 111 of each layer, and one third tab unit 61 is disposed on the second straight portion 211 of each layer. In this case, the first tab 40, the second tab 50, and the third tab 60 are all located in the first part 102. The plurality of tabs may be bent at a time, thereby reducing complexity of a manufacturing process.

[0037] Still referring to FIG. 3, in the thickness direction

of the electrode assembly, a projection of the third tab 60 on the projection plane is located between a projection of the first tab 40 and a projection of the second tab 50. Understandably, in other embodiments, the first tab 40 may be located between the third tab 60 and the second tab 50, or the second tab 50 is located between the first tab 40 and the third tab 60, and this application is not limited to the examples given herein. A direction indicated by an arrow C in FIG. 3 is a length direction of the electrode assembly 100. In the first embodiment, the first tab 40, the second tab 50, and the third tab 60 all extend from the first end 104 of the electrode assembly 100 in the length direction. In other embodiments, the first tab 40, the second tab 50, and the third tab 60 may extend from the second end 105 of the electrode assembly 100 in the length direction.

Second Embodiment

[0038] Referring to FIG. 4 and FIG. 5, an electrode assembly 100 in the second embodiment is almost identical to that in the first embodiment, but differs in: in the second embodiment, the first winding units 11 are sorted when the first electrode plate 10 is unwound, and both the first tab units 41 and the second tab units 51 are disposed on the even-numbered first winding units 11. The second winding units 21 are sorted when the second electrode plate 20 is unwound, and the third tab units 61 are disposed on the even-numbered second winding units 21. Therefore, after a winding process is completed, the first tab units 41, the second tab units 51, and the third tab units 61 are all disposed in the second part 103. Other structures of the electrode assembly 100 in the second embodiment, which are almost identical to those in the first embodiment, are omitted herein.

[0039] Understandably, in another optional embodiment, the first tab units 41 are disposed on the odd-numbered first winding units 11, and the second tab units 51 are disposed on the even-numbered first winding units 11. In this case, the plurality of first tab units 41 are disposed in the first part 102, and the plurality of second tab units 51 are disposed in the second part 103. This increases a spacing between the first tab 40 and the second tab 50, avoids interference between the first tab 40 and the second tab 50 in a manufacturing or bending process, and simplifies the manufacturing. In this case, the third tab units 61 may be disposed in the first part 102 or the second part 103, and may be disposed in both the first part 102 and the second part 103.

Third Embodiment

[0040] Referring to FIG. 6 and FIG. 7, an electrode assembly 100 in the third embodiment is almost identical to that in the first embodiment, but differs in: in the third embodiment, one first tab unit 41 and one second tab unit 51 are disposed on each first winding unit 11, and one third tab unit 61 is disposed on each second winding

unit 21. In this case, the first tab unit 41, the second tab unit 51, and the third tab unit 61 are disposed on both the first part 102 and the second part 103 of the electrode assembly 100. A thickness of the first tab 40, the second tab 50, and the third tab 60 is increased, and an internal resistance of the electrode assembly 100 is reduced effectively. Other structures of the electrode assembly 100 in the third embodiment, which are almost identical to those in the first embodiment, are omitted herein.

Fourth Embodiment

[0041] Referring to FIG. 8 and FIG. 9, an electrode assembly 100 in the fourth embodiment is almost identical to that in the first embodiment, but differs in: in the fourth embodiment, two adjacent first tab units 41 are interspaced with a layer of the first straight portion 111 containing no first tab unit 41, and the first straight portion 111 containing no first tab unit 41 is defined as a spacer layer. The second tab units 51 are disposed on the spacer layers. In other words, the first tab units 41 are disposed on a first winding unit 11 different from that on which the second tab units 51 are disposed. On the one hand, this disposition manner is suitable for a circumstance in which the size of the electrode assembly 100 is relatively small in a width direction (the direction indicated by an arrow B in FIG. 2), and can prevent the first tab units 41 from being too close to the second tab units 51, and improve manufacturability of the electrode assembly 100. On the other hand, with the disposed spacer layer, it is prevented that heat dissipation performance of the tabs is affected by a too short spacing between the plurality of tab units.

[0042] From a perspective of FIG. 9, the first tab units 41 are roughly disposed on the left side on the first layer of first straight portion 111, and the second tab units 51 are roughly disposed on the right side on the spacer layer. The third tab units 61 are roughly disposed in the middle of the second straight portion 211. In addition, in the first part 102 of the electrode assembly 100, one third tab unit 61 is disposed on each layer of second straight portion 211, so that the third tab 60 is located between the first tab 40 and the second tab 50. In the fourth embodiment, the first tab units 41, the second tab units 51, and the third tab units 61 are all disposed in the first part 102. In other embodiments, the first tab units 41, the second tab units 51, and the third tab units 61 may also be disposed in the second part 103, or disposed in both the first part 102 and the second part 103. The third tab units 61 may also be disposed at a lateral position of the second straight portion, so that the first or second tab is in a middle position. Understandably, a quantity of the first/second/third tab units may be set according to actual product requirements, and this application is not limited thereto.

[0043] In another optional embodiment, two adjacent third tab units 61 are interspaced with at least one second winding unit 21. As seen from the thickness direction of the electrode assembly 100, two adjacent third tab units

61 are interspaced with at least one layer of second straight portion 211 to increase a spacing between the adjacent third tab units 61.

Fifth Embodiment

[0044] Referring to FIG. 10, FIG. 11, and FIG. 12, an electrode assembly 100 in the fifth embodiment is almost identical to that in the first embodiment, but differs in: in the fifth embodiment, in a length direction of the electrode assembly 100, the first tab units 41 are located at a first end 104 of the electrode assembly 100, and the second tab units 51 are located at a second end 105 of the electrode assembly 100. Therefore, in the length direction of the electrode assembly 100, the first tab 40 extends from the first end 104 of the electrode assembly 100, and the second tab 50 extends from the second end 105 of the electrode assembly 100. In this embodiment, the third tab units 61 may be disposed at the first end 104 or the second end 105. FIG. 12 shows an example in which the third tab 60 extends from the first end 104, but the example does not limit the position of the third tab 60.

[0045] Further, the plurality of first tab units 41, the plurality of second tab units 51, and the first electrode plate 10 are integrally formed, and the plurality of third tab units 61 and the second electrode plate 20 are integrally formed. Specifically, a raw material used to manufacture the first electrode plate 10 may be cut so that the first tab units 41 and the second tab units 51 are formed on the first electrode plate 10. A raw material used to manufacture the second electrode plate 20 may be cut so that the third tab units 61 are formed on the second electrode plate 20.

[0046] In an optional embodiment, referring to FIG. 18, the electrode assembly 100 includes a tab plate 80. The first tab units 41 are the first end 81 of the tab plate 80, and the second tab units 51 are the second end 82. The tab plate 80 is disposed on the first winding unit 11 of the first electrode plate 10, and the first end 81 and the second end 82 of the tab plate 80 extend from the first winding unit 11. Specifically, the tab plate 80 is roughly long-strip-shaped. A length of the tab plate 80 is greater than a length of the electrode assembly 100. Therefore, the tab plate 80 can run through the electrode assembly 100. The first tab 40 extends from the first end 104 of the electrode assembly 100, and the second tab 50 extends from the second end 105 of the electrode assembly 100. In another embodiment, the tab plate 80 may also be roughly U-shaped so that the first tab 40 and the second tab 50 extend from an identical end of the electrode assembly 100.

[0047] The disposition of the tab plate 80 is conducive to simplifying an installation process of the first tab 40 and the second tab 50.

Sixth Embodiment

[0048] Referring to FIG. 13 and FIG. 14, an electrode

assembly 100 in the sixth embodiment is almost identical to that in the first embodiment, but differs in: in the sixth embodiment, a plurality of fourth tab units 71 are further disposed on the second electrode plate 20, and the plurality of fourth tab units 71 are stacked in the thickness direction of the electrode assembly 100 to form a fourth tab. The first tab 40, the second tab 50, the third tab 60, and the fourth tab extend from an identical end of the electrode assembly 100. The disposition of the fourth tab can further shunt the current and enhance the current-carrying capacity of the electrode assembly 100. In other embodiments, the fourth tab units 71 may also be disposed on the first tab 10. In this way, the electrode assembly 100 is provided with three negative tabs and one positive tab, or with three positive tabs and one negative tab.

Seventh Embodiment

[0049] Referring to FIG. 15 and FIG. 16, an electrode assembly 100 in the seventh embodiment is almost identical to that in the sixth embodiment, but differs in: in the seventh embodiment, in a length direction of the electrode assembly 100, the first tab 40 and the third tab 60 are located at a first end 104 of the electrode assembly 100, and the second tab 50 and the fourth tab are located at a second end 105 of the electrode assembly 100. Understandably, the third tab units 61 and the fourth tab units 71 may also be an integrally formed structure. In other embodiments, three tabs extend from one end of the electrode assembly 100 and one tab extends from the other end. The plurality of tabs may be arranged and combined according to actual application scenarios.

Eighth Embodiment

[0050] Referring to FIG. 19, an electrode assembly 100 in the eighth embodiment is almost identical to that in the fifth embodiment, but differs in: in the eighth embodiment, two electrical connection portions 42 are disposed at an end at which the first tab 40 extends from the electrode assembly 100. The two electrical connection portions 42 are interspaced and configured to connect an external circuit or an electrical appliance. In this way, the first tab 40 is divided into two tabs of identical polarity, thereby further shunting the current and increasing the current-carrying capacity of the electrode assembly 100. The electrical connection portions 42 may be formed by welding a tab adapter onto the first tab 40, or may be formed by cutting the first tab 40. Understandably, in other embodiments, a quantity of electrical connection portions 42 on the first tab 40 may be more than two, and this application is not limited thereto. By analogy, a plurality of electrical connection portions may also be disposed on the second tab 50 and the third tab 60, and in this case, the second tab 50 is omissible.

Ninth Embodiment

[0051] Referring to FIG. 20, the ninth embodiment provides a battery 200, including a housing 201 and the electrode assembly 100 disclosed in any of the foregoing embodiments. The housing 201 accommodates the electrode assembly 100. Further, the battery 200 includes a plurality of electrode terminals 202 disposed on an outer surface of the housing 201, and each electrode terminal 202 is electrically connected to the first tab 40, the second tab 50, and the third tab 60 separately.

[0052] The foregoing embodiments are merely intended for describing the technical solutions of this application but not intended as a limitation. Although this application is described in detail with reference to the foregoing optional embodiments, a person of ordinary skill in the art understands that modifications or equivalent substitutions may be made to the technical solutions of this application without departing from the spirit and scope of the technical solutions of this application.

Claims

1. An electrode assembly, comprising:
 - a first electrode plate;
 - a second electrode plate, wherein a polarity of the second electrode plate is opposite to a polarity of the first electrode plate; and
 - a separator, disposed between the first electrode plate and the second electrode plate, wherein the electrode assembly is formed by winding the first electrode plate, the separator, and the second electrode plate, **characterized in that**, a plurality of first tab units and a plurality of second tab units are disposed on the first electrode plate, and a plurality of third tab units are disposed on the second electrode plate; and
 - in a thickness direction of the electrode assembly, the plurality of first tab units are stacked to form a first tab, the plurality of second tab units are stacked to form a second tab, and the plurality of third tab units are stacked to form a third tab.
2. The electrode assembly according to claim 1, wherein in the thickness direction of the electrode assembly, projections of the first tab, the second tab, and the third tab on a projection plane perpendicular to the thickness direction of the electrode assembly do not overlap.
3. The electrode assembly according to claim 2, wherein the first electrode plate comprises a plurality of first winding units, and the plurality of first tab units and the plurality of second tab units are distributed

- on the plurality of first winding units; the second electrode plate comprises a plurality of second winding units, and the plurality of third tab units are distributed on the plurality of second winding units; and each first winding unit comprises a first straight portion and a first bent portion, each second winding unit comprises a second straight portion and a second bent portion, and a plurality of first straight portions and a plurality of the second straight portions are alternately stacked.
4. The electrode assembly according to claim 3, wherein two adjacent first tab units are interspaced with a layer of the first straight portion containing no first tab unit, and the first straight portion containing no first tab unit is defined as a spacer layer.
 5. The electrode assembly according to claim 4, wherein the second tab units are disposed on the spacer layers.
 6. The electrode assembly according to claim 3, wherein the electrode assembly comprises a winding initiation end, and the winding initiation end divides the electrode assembly into a first part and a second part in the thickness direction of the electrode assembly; and the plurality of first tab units are disposed in the first part, and the plurality of second tab units are disposed in the second part.
 7. The electrode assembly according to claim 3, at least one first winding unit is provided with one first tab unit and one second tab unit.
 8. The electrode assembly according to any one of claims 3 to 7, wherein two adjacent third tab units are interspaced with at least one second winding unit.
 9. The electrode assembly according to any one of claims 3 to 7, wherein one third tab unit is disposed on each second winding unit.
 10. The electrode assembly according to any one of claims 3 to 7, wherein in a length direction of the electrode assembly, the first tab units are located at a first end of the electrode assembly, and the second tab units are located at a second end of the electrode assembly.
 11. The electrode assembly according to claim 3, wherein the electrode assembly comprises a tab plate, the first tab units being configured as a first end of the tab plate, the second tab units being configured as a second end of the tab plate, the tab plate is disposed on the first winding unit, and the first end and the second end of the tab plate extend from the first winding unit.
 12. The electrode assembly according to claim 1, wherein in the plurality of first tab units, the plurality of second tab units, and the first electrode plate are integrally formed, and the plurality of third tab units and the second electrode plate are integrally formed.
 13. The electrode assembly according to claim 1, wherein a plurality of fourth tab units are further disposed on the first electrode plate or the second electrode plate, and the plurality of fourth tab units are stacked in the thickness direction of the electrode assembly to form a fourth tab.
 14. The electrode assembly according to claim 13, wherein in a length direction of the electrode assembly, the third tab is located at a first end of the electrode assembly, and the fourth tab is located at a second end of the electrode assembly.
 15. The electrode assembly according to claim 2, wherein, in the thickness direction of the electrode assembly, a projection of the third tab on the projection plane is located between a projection of the first tab and a projection of the second tab.
 16. The electrode assembly according to claim 1, wherein at least two electrical connection portions are disposed at an end of the first tab extending from the electrode assembly, and the at least two electrical connection portions are interspaced and configured for connection with an external circuit.
 17. The electrode assembly according to claim 1, wherein a material of the first tab or the third tab is copper, nickel, or nickel-plated copper.
 18. A battery, comprising a housing and an electrode assembly according to any one of claims 1 to 17, and the housing accommodates the electrode assembly.
 19. The battery according to claim 18, wherein the battery comprises a plurality of electrode terminals disposed on an outer surface of the housing, and each electrode terminal is electrically connected to the first tab, the second tab, and the third tab separately.

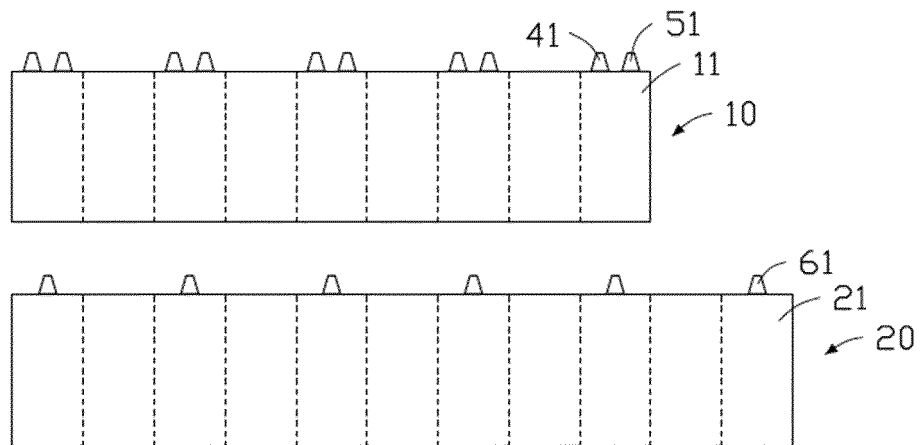


FIG. 1

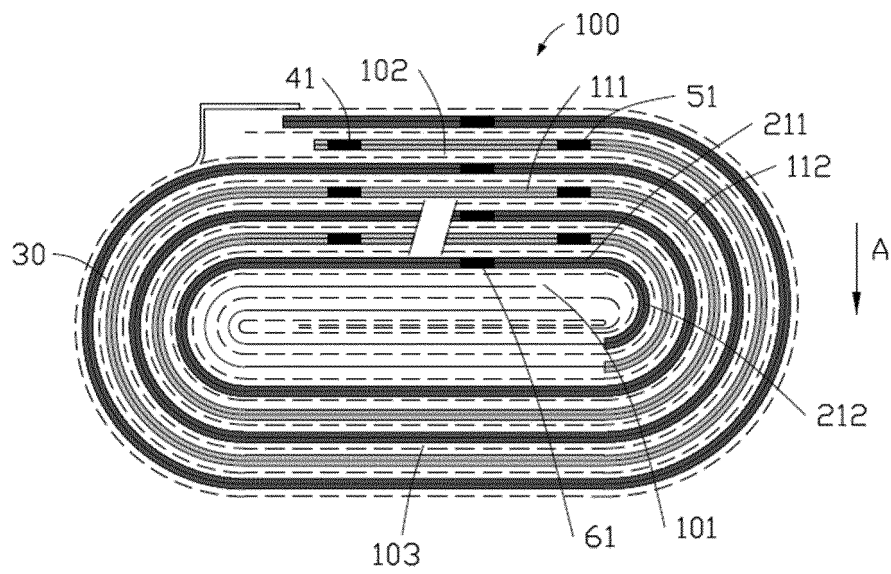


FIG. 2

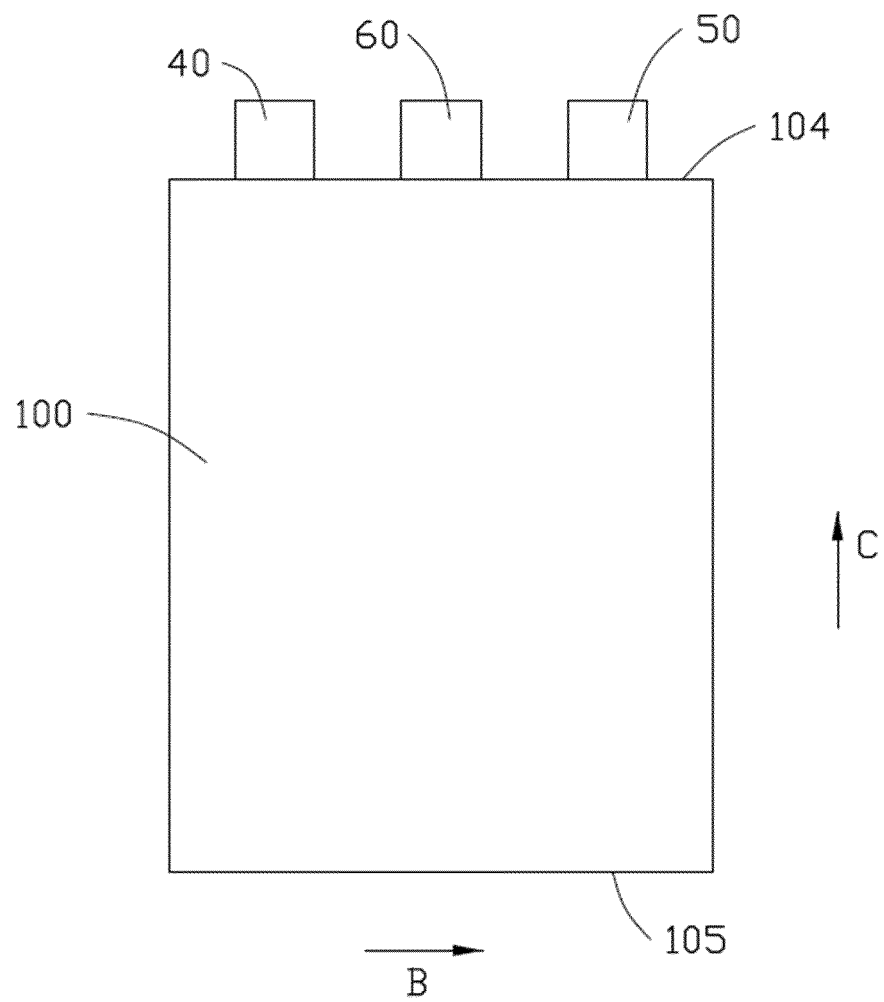


FIG. 3

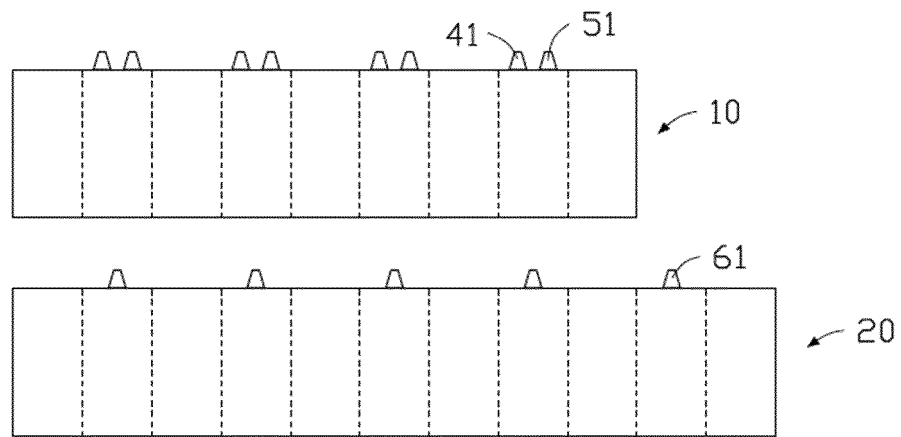


FIG. 4

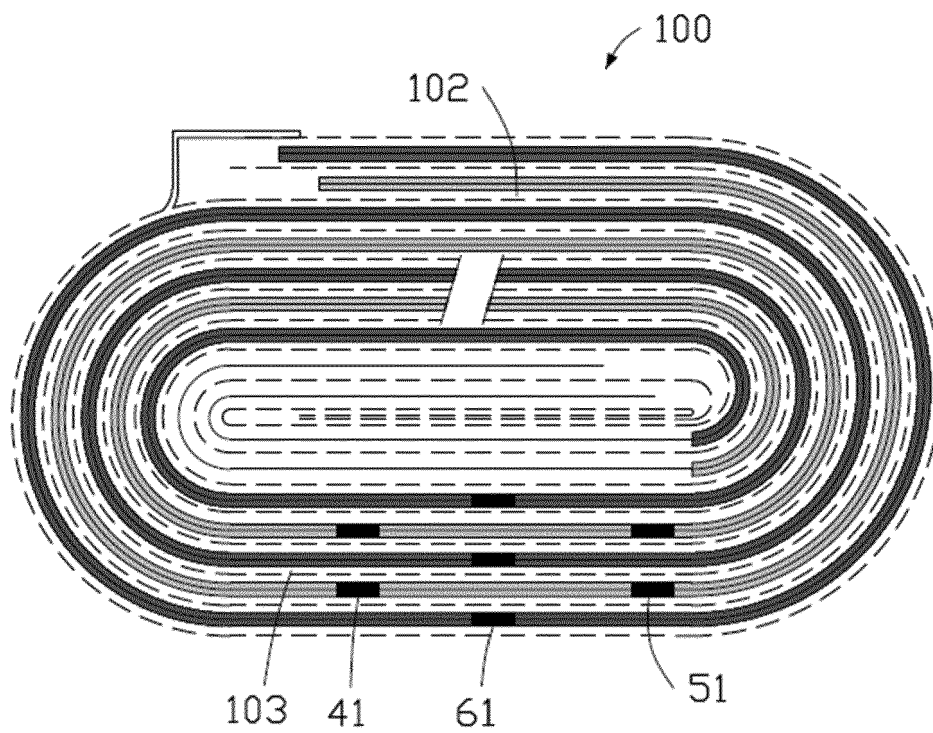


FIG. 5

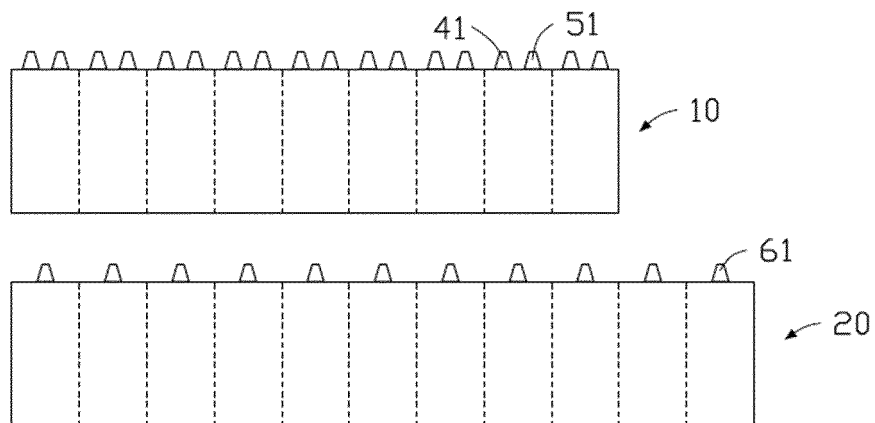


FIG. 6

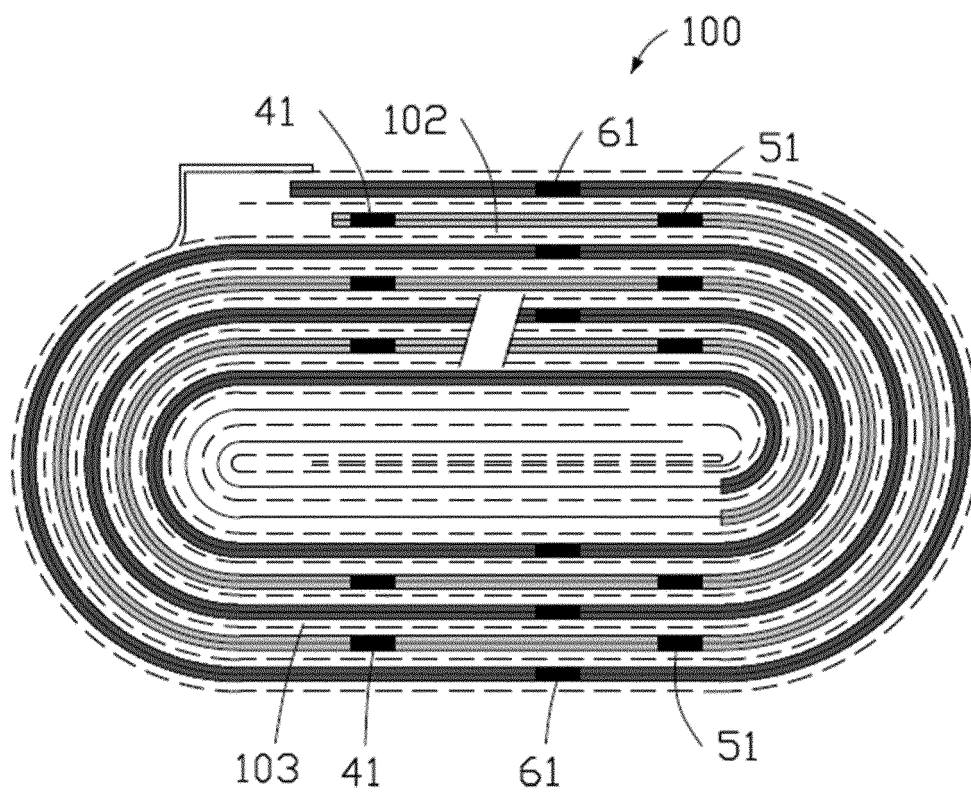


FIG. 7

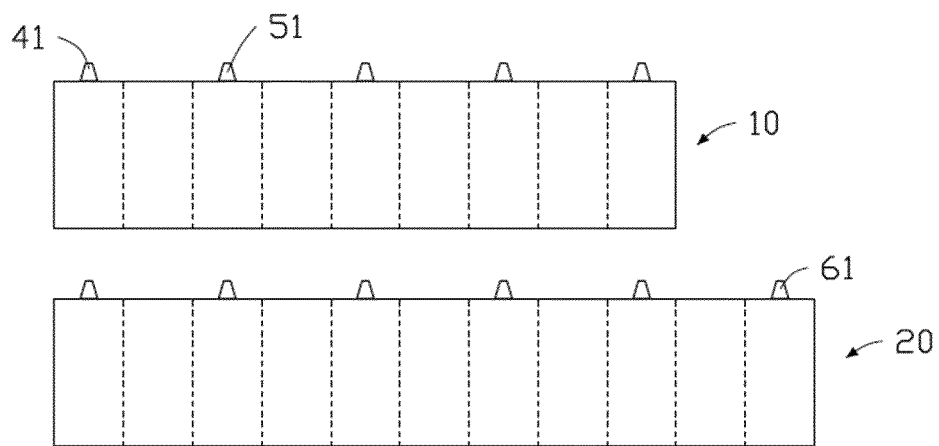


FIG. 8

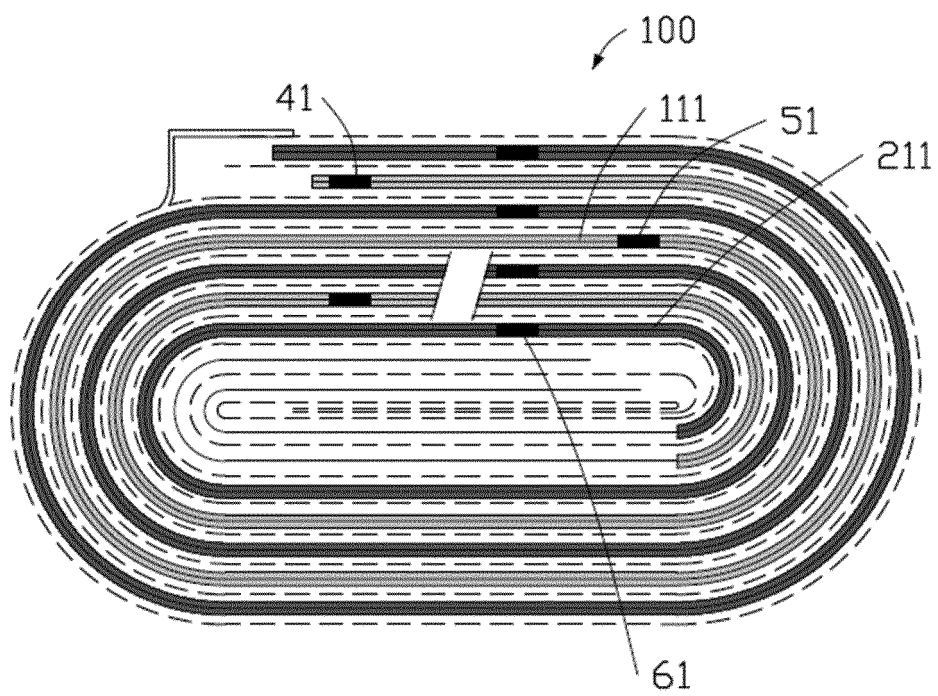


FIG. 9

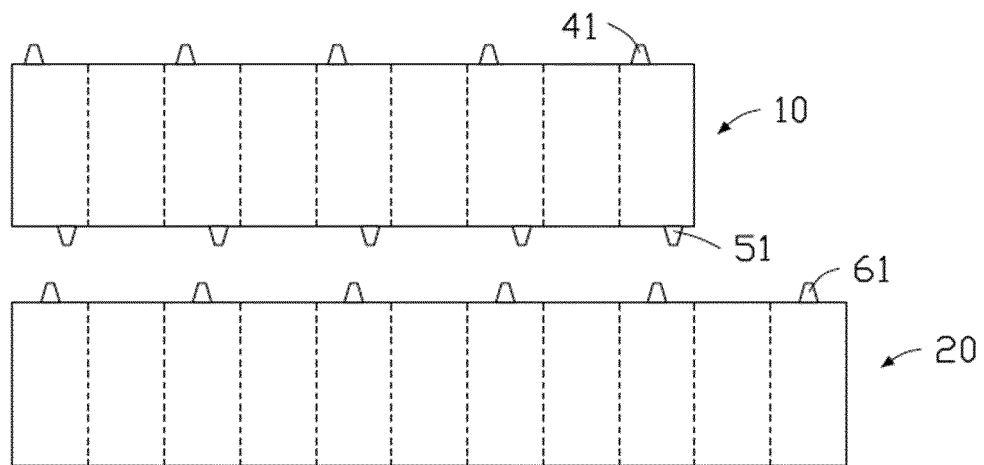


FIG. 10

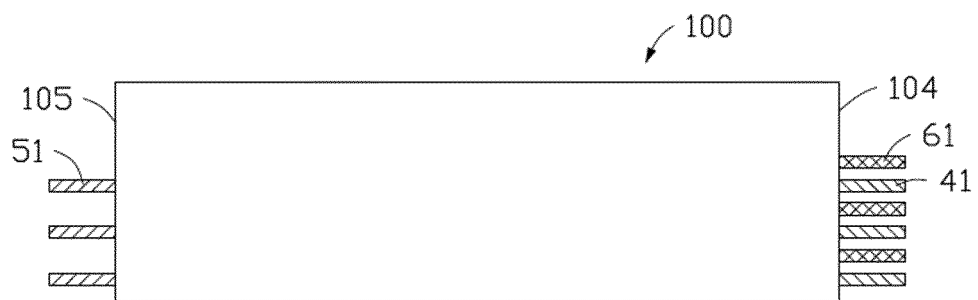


FIG. 11

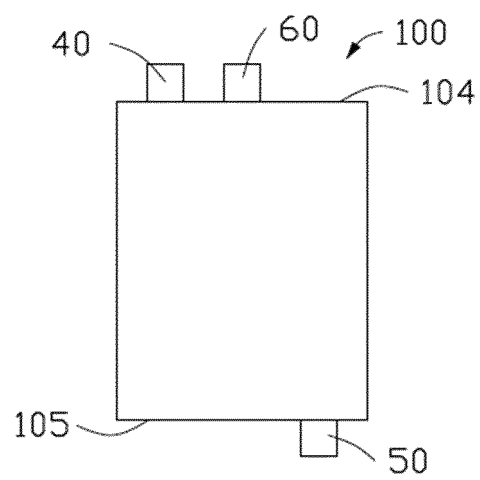


FIG. 12

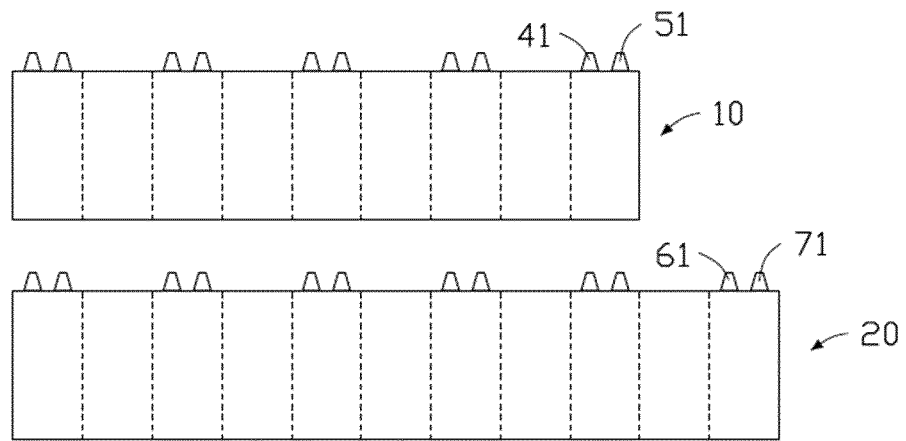


FIG. 13

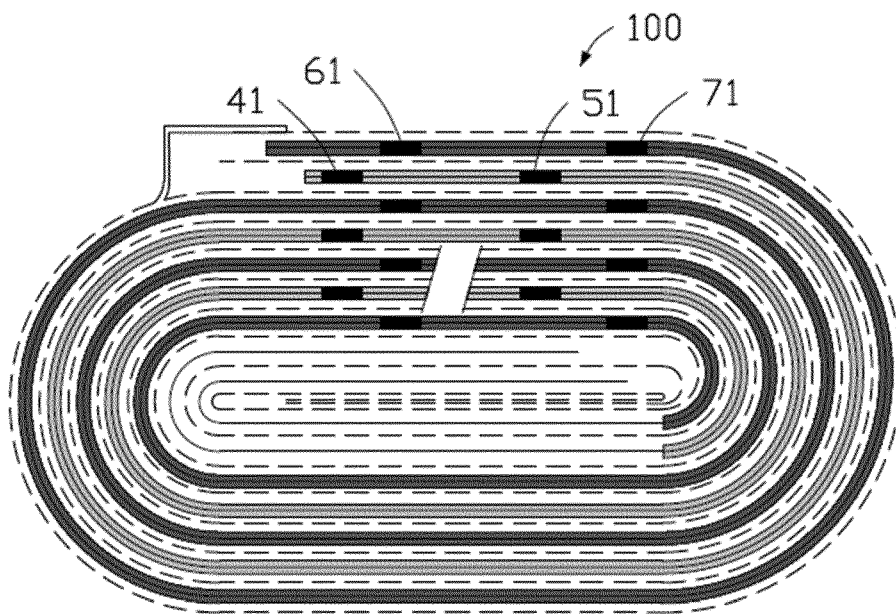


FIG. 14

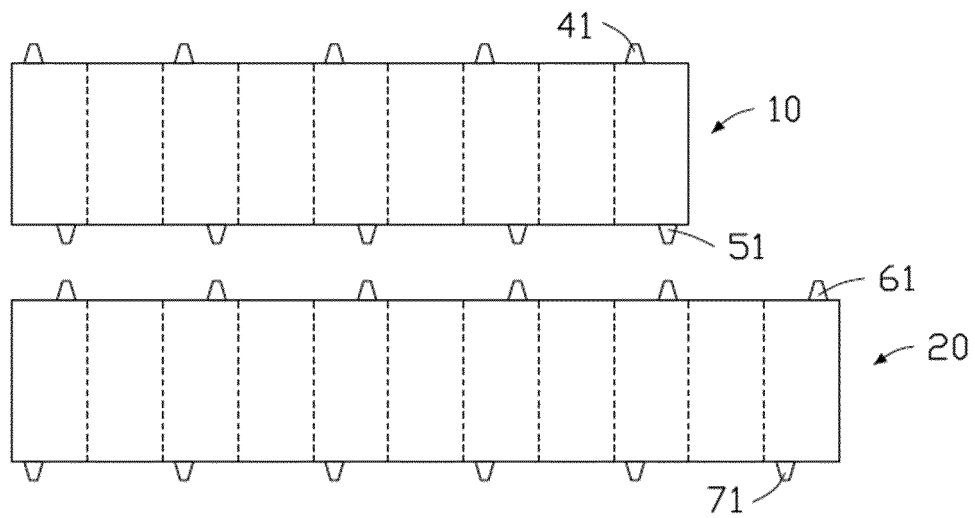


FIG. 15

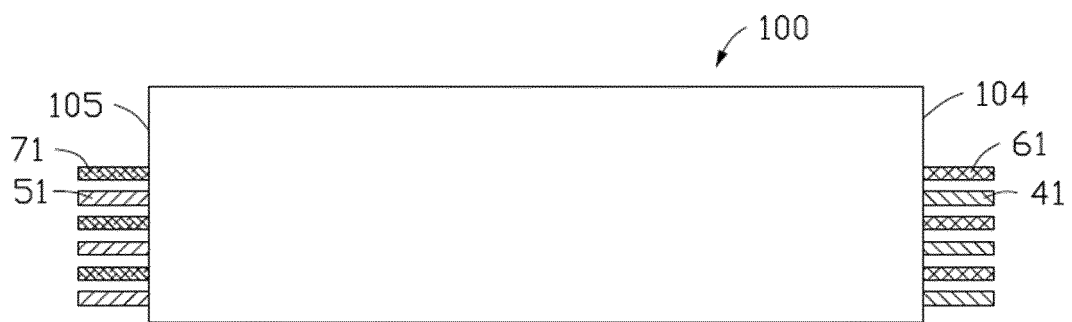


FIG. 16

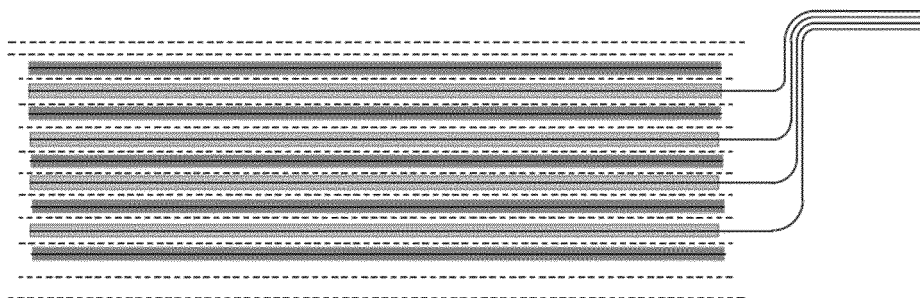


FIG. 17

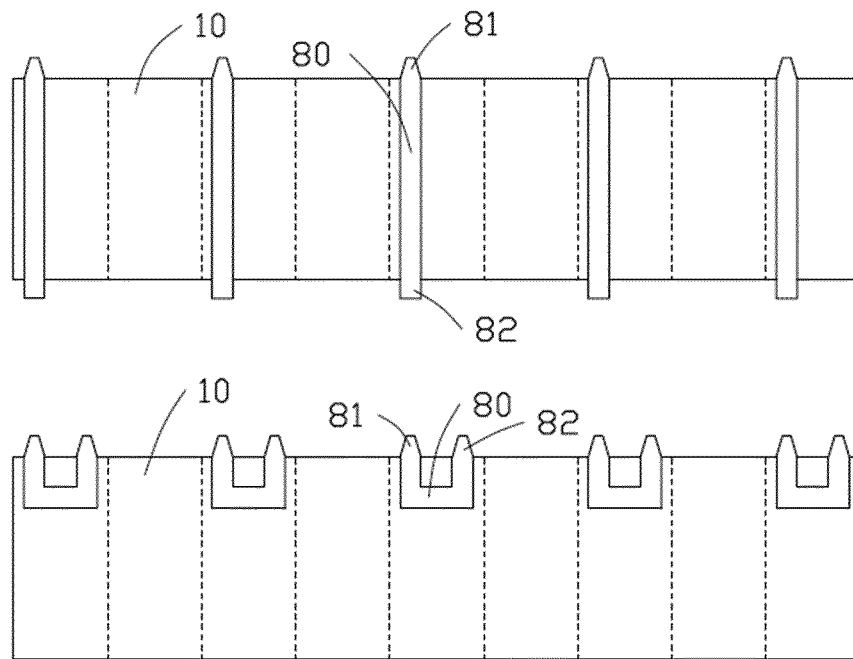


FIG. 18

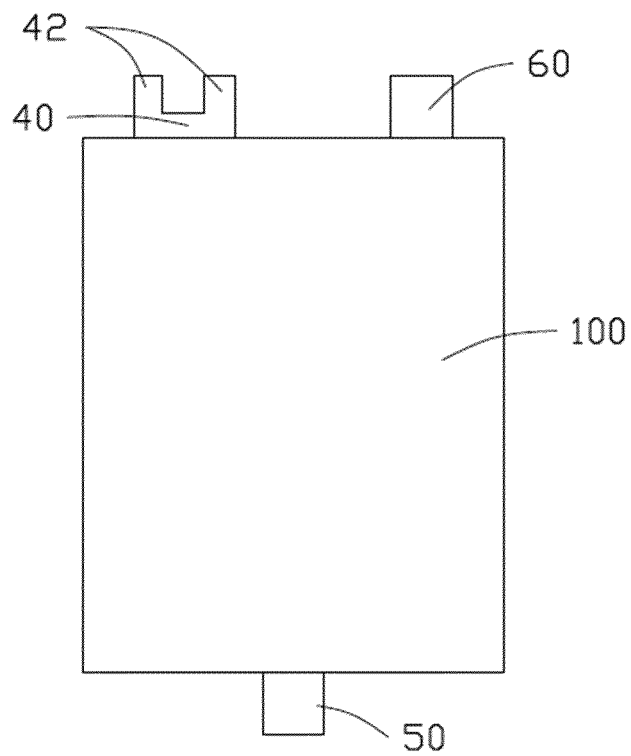


FIG. 19

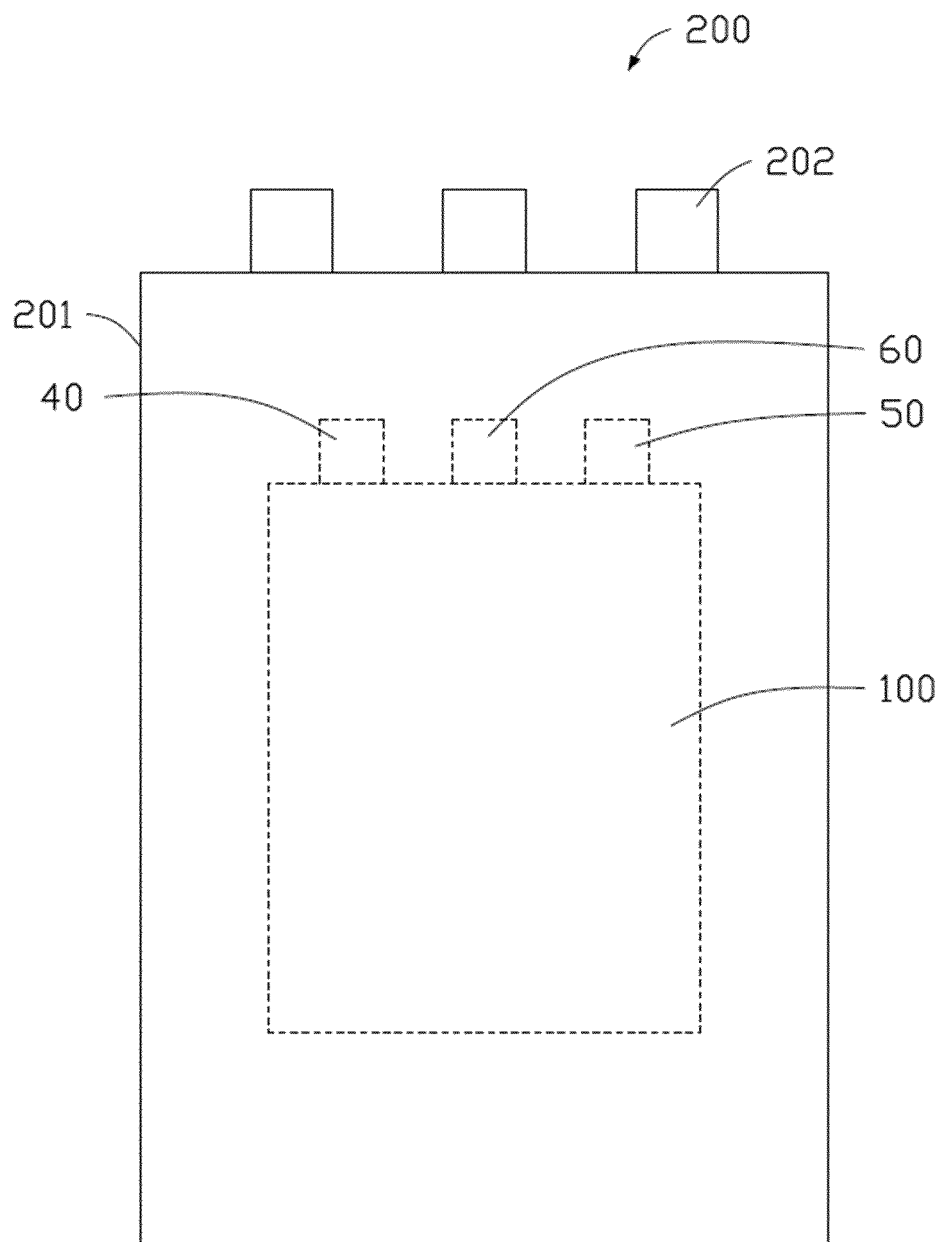


FIG. 20

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2020/073339

A. CLASSIFICATION OF SUBJECT MATTER H01M 2/26(2006.01)i According to International Patent Classification (IPC) or to both national classification and IPC																					
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) H01M Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) WPI, EPODOC, CNPAT, CNKI: 电池, 电极, 极耳, 多极耳, 多个极耳, 三极耳, 三个极耳, 上端, 下端, 上下端, 上下两端, battery, cell, electrode, tab+, lug+, pole+, multiple, three, triple, upper, top, bottom, lower, end+																					
C. DOCUMENTS CONSIDERED TO BE RELEVANT <table border="1"> <thead> <tr> <th>Category*</th> <th>Citation of document, with indication, where appropriate, of the relevant passages</th> <th>Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>X</td> <td>CN 209592175 U (CONTEMPORARY AMPEREX TECHNOLOGY LTD.) 05 November 2019 (2019-11-05) description, paragraphs 0003-0014, 0051-0061, 0086-0091, claims 1, 8-10, figure 11</td> <td>1-19</td> </tr> <tr> <td>X</td> <td>CN 209607862 U (YUYAO TIANKAI ENERGY TECHNOLOGY CO., LTD.) 08 November 2019 (2019-11-08) description, paragraphs 0016-0035, figures 1-6</td> <td>1-19</td> </tr> <tr> <td>X</td> <td>CN 103259050 A (SHENZHEN GREPOW BATTERY CO., LTD.) 21 August 2013 (2013-08-21) description, paragraphs 0045-0081, figures 1-5</td> <td>1-19</td> </tr> <tr> <td>X</td> <td>CN 204885269 U (DONGGUAN GENERAL EXPLORING BATTERY TECHNOLOGY CO., LTD.) 16 December 2015 (2015-12-16) description, paragraphs 0003-0032, figures 1-4</td> <td>1-19</td> </tr> <tr> <td>A</td> <td>CN 101714624 A (GUANGZHOU FULLRIVER BATTERY NEW TECHNOLOGY CO., LTD.) 26 May 2010 (2010-05-26) entire document</td> <td>1-19</td> </tr> <tr> <td>A</td> <td>CN 202487691 U (ZHANG, Chuanbao) 10 October 2012 (2012-10-10) entire document</td> <td>1-19</td> </tr> </tbody> </table>	Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	X	CN 209592175 U (CONTEMPORARY AMPEREX TECHNOLOGY LTD.) 05 November 2019 (2019-11-05) description, paragraphs 0003-0014, 0051-0061, 0086-0091, claims 1, 8-10, figure 11	1-19	X	CN 209607862 U (YUYAO TIANKAI ENERGY TECHNOLOGY CO., LTD.) 08 November 2019 (2019-11-08) description, paragraphs 0016-0035, figures 1-6	1-19	X	CN 103259050 A (SHENZHEN GREPOW BATTERY CO., LTD.) 21 August 2013 (2013-08-21) description, paragraphs 0045-0081, figures 1-5	1-19	X	CN 204885269 U (DONGGUAN GENERAL EXPLORING BATTERY TECHNOLOGY CO., LTD.) 16 December 2015 (2015-12-16) description, paragraphs 0003-0032, figures 1-4	1-19	A	CN 101714624 A (GUANGZHOU FULLRIVER BATTERY NEW TECHNOLOGY CO., LTD.) 26 May 2010 (2010-05-26) entire document	1-19	A	CN 202487691 U (ZHANG, Chuanbao) 10 October 2012 (2012-10-10) entire document	1-19
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Date of the actual completion of the international search 27 September 2020	Date of mailing of the international search report 21 October 2020																				
Name and mailing address of the ISA/CN China National Intellectual Property Administration (ISA/CN) No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088 China Facsimile No. (86-10)62019451	Authorized officer Telephone No.																				

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2020/073339

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 2019040720 A (MURATA MANUFACTURING CO., LTD.) 14 March 2019 (2019-03-14) entire document	1-19

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/CN2020/073339

Patent document cited in search report			Publication date (day/month/year)		Patent family member(s)		Publication date (day/month/year)	
CN	209592175	U	05 November 2019		None			
CN	209607862	U	08 November 2019		None			
CN	103259050	A	21 August 2013		CN	103259050	B	23 September 2015
CN	204885269	U	16 December 2015		None			
CN	101714624	A	26 May 2010		None			
CN	202487691	U	10 October 2012		None			
JP	2019040720	A	14 March 2019		None			

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